Making 'Pavlov's Cockroach'

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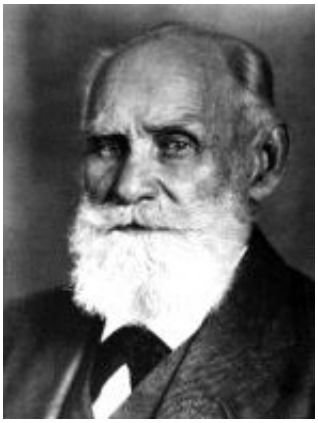

Ivan Pavlov (1849-1936)

In an experiment that made him a household name, the Russian scientist Ivan Pavlov a century ago got dogs used to hearing a bell every time they were fed. The dogs soon started drooling whenever they heard the bell.

Now, scientists are trying to get cockroaches to follow the same trailblazing path as “Pavlov’s Dog,” the words still commonly used in reference to Pavlov’s work (though he really used more than one dog).

Drooling, or salivation, is a natural physiological response to the presence of food. The salivation aids digestion.

Hidehiro Watanabe and Makoto Mizunami of Tohoku University in Sendai, Japan, offered cockroaches a whiff of peppermint two seconds

before giving them some sugar.

After repeating this three times, they found that cockroach nervous system cells that control salivation started firing signals more strongly whenever the peppermint odor came. They also found that this effect, measured by means of tiny implanted electrodes, persisted a day later.

The salivation had nothing to do with an enjoyment of the peppermint odor itself, they argued. They noted that cockroaches naturally prefer vanilla odor, but that when they tried the same experiment using vanilla but no food, there was no increase in salivation-related brain activity.

Watanabe and Mizunami reported that they haven't yet measured the actual saliva levels in the cockroaches during such experiments, but that they're working on this.

The process in which an organism starts to behave a certain way as a result of learning a connection between two previously unrelated stimuli, as in Pavlov's experiment, is called conditioning.

"Classical conditioning of salivation has been extensively studied in mammals, especially in dogs," wrote Watanabe and Mizunami in a paper describing their findings, in the Feb. 15 issue of the *Journal of Experimental Biology*. "But, as far as we know, it has not been reported in any non-mammalian species," they added, although conditioning involving effects other than salivation has been.

The new findings shows cockroaches should serve as good models for studying how individual brain cells participate in conditioning, they added.

*by Jack Lucentini - World Science (*http://www.world-science.net*)*

The original story can be found here.